

Molting Pacific Steller's Eider Surveys in Southwest Alaska, 2016

By

Alison R. Williams, Timothy D. Bowman, and Bradley S. Shults

November 2016

U.S. Fish and Wildlife Service
Division of Migratory Bird Management
1011 E. Tudor Road
Anchorage, AK 99503

Molting Pacific Steller's Eider Survey in Southwest Alaska, 2016

Abstract

This report presents the results of the fifth consecutive year of a photographic survey for molting Steller's eiders along the north side of the Alaska Peninsula. We used fixed-wing aircraft to conduct a photographic survey of molting Steller's eiders at major lagoons along the Alaska Peninsula from King Salmon to Izembek Lagoon from 26 August to 2 September. We estimated 40,025 Steller's eiders molting at surveyed areas along the Alaska Peninsula, with 8,484 birds at Seal Islands, 24,716 at Nelson Lagoon, 6,457 at Izembek Lagoon, and 368 at Port Heiden. The 2016 estimate was 25% below the mean count from 2012-2015 (53,651). Within-year survey replicates were not completed in 2016 due to logistical constraints, and we recommend reinstituting these replicates in future surveys to measure sampling errors and identify sources of temporal variation.

Key Words: Alaska, Steller's eider, *Polysticta stelleri*, population index, aerial, photographic, survey, molt.

Suggested Citation: Williams, A.R., T.D. Bowman, and B.S. Shults. 2016. Molting Pacific Steller's Eider Survey in Southwest Alaska, 2016. Unpublished. U.S. Fish and Wildlife Service Report, Migratory Bird Management, Anchorage, Alaska.

Introduction

Greater than 90% of the Pacific population of Steller's eider (*Polysticta stelleri*) molts and winters in Alaska, and are identified as "Vulnerable" by the International Union for Conservation of Nature (BirdLife International 2012). The Alaska breeding population was listed as threatened under the Endangered Species Act in 1997 due to population decline and range contraction (Federal Register 1997).

From 1992 to 2012, the U.S. Fish and Wildlife Service's (USFWS) Migratory Bird Management Program flew spring aerial surveys in southwest Alaska to monitor trends in the Pacific wintering population of Steller's eiders and improve understanding of habitat use and timing of spring migration (Larned 2012). The spring migration survey targeted flocks of Steller's eiders at migratory staging areas throughout southwest Alaska. Given the transitory nature of these staging flocks, optimal survey timing was unpredictable between years. To counter the temporal variance in flock distribution, multiple within-year survey replicates were flown during the early years of the survey. However, monetary and logistical constraints curtailed the strategy, and a single, annual survey was flown in later years. The spring survey also contained inherent flock estimation bias as a result of ocular estimation. This source of error was amplified by the behavior of flighted migrating flocks, which tend to flush, dive synchronously, and join with other flocks when overflown by aircraft, resulting in under-counting or double-counting of some flocks. Spring weather systems in southwest

Alaska are also complicated and erratic, compromising safety and visibility during survey flights. These weather systems can hamper efforts to survey when flocks are present at staging areas, and can unpredictably trigger mass migrations. In addition, spring flocks can be offshore, putting survey crews at high risk in an area and season where search and rescue efforts are difficult.

To improve annual monitoring of this species and increase safety of air crews, Migratory Bird Management tested the feasibility of aerial photography to estimate abundance of Steller's eider during the autumn molt in 2012 (Wilson et al. 2013). The photographic survey in 2012 was successful in obtaining images of sufficient quality to identify and enumerate Steller's eiders from altitudes that did not cause flocks to dive, thereby reducing bias associated with flock estimation and availability. A photographic survey of molting Steller's eiders has subsequently been repeated annually, with improvements in equipment, techniques, and crew resource management strategies each year (Anderson et al. 2016).

In contrast to the spring survey, the fall molting survey occurs when birds are sedentary during the approximately month-long flightless molt period (Flint et al. 2000). This allows for more flexibility in working around periods of inclement weather or logistical complications. Flocks of molting eiders consistently use the same molting areas from year to year and are typically aggregated in large, dense flocks close to shore in lagoons along the north side of the Alaska Peninsula, protected by long, narrow, and partially vegetated barrier islands (Dau et al. 2000). Relative to spring, weather during early fall on the Alaska Peninsula has longer periods of favorable weather and more predictable storm systems. As a result, the majority of the population of molting Steller's eiders can be tallied with a single survey.

Methods

The 2016 photographic survey of molting Steller's eiders was flown using a USFWS Cessna 206 on Wipline 3450 amphibious floats. We searched all suitable habitat for molting eiders at Egegik bay, Ugashik bay, Cinder River, Port Heiden, Seal Islands, Port Moller, Nelson Lagoon and the Izembek Lagoon complex (Figure 1). Flocks of eiders were observed and photographed at Port Heiden, Seal Islands, Nelson Lagoon, and Izembek Lagoon. While surveying from King Salmon to Nelson Lagoon, the survey crew consisted of a pilot (Brad Shults), a right front observer (Alison Williams), and a left rear seat photographer (Tim Bowman). The survey crew at Izembek Lagoon was reduced to a pilot (Brad Shults) and a rear left seat photographer (Alison Williams). (Appendix 1).

Habitats within the lagoons and bays were searched thoroughly based on historical knowledge of abundance and distribution from earlier surveys (Wilson et al. 2013). Before attempting to photograph flocks at Nelson Lagoon and Seal Islands, we flew a reconnaissance survey of each area at approximately 1,500 feet above ground level (AGL) to determine distribution of birds within the lagoons and formulate an efficient strategy for

photographing. A reconnaissance survey was not done at Izembek Lagoon due to logistical constraints, the lagoon being too large to search prior to survey. Molting Steller's eiders rarely dove on our first lower level overflight (700-900 feet AGL), but were increasingly likely to dive on successive overflights. Therefore, we strove to photograph all flocks on the first lower level pass following the reconnaissance survey. We timed flights at Nelson Lagoon to be at or near low tide, when flocks of Steller's eiders were more concentrated in channels. In several previous years, Izembek Lagoon has been surveyed at high tide with little wind, when aggregations of molting eiders were visible at great distances. However, due to a narrow window of favorable surveying weather, Izembek Lagoon was surveyed at low tide in 2016. This timing was originally suggested by Wilson et al. (2013), as they proposed that flocks were best photographed while concentrated in channels at low tide. During the photographic surveys we flew with 10° of flaps, at an altitude between 700 and 900 feet AGL with groundspeeds that ranged from 80 to 100 knots, depending on wind direction and wind speed. The pilot used a GPS that displayed the aircraft's track to ensure full coverage of the survey area. At Izembek Lagoon, GPS waypoints were created above flocks as an additional method to ensure that the groups were not surveyed multiple times.

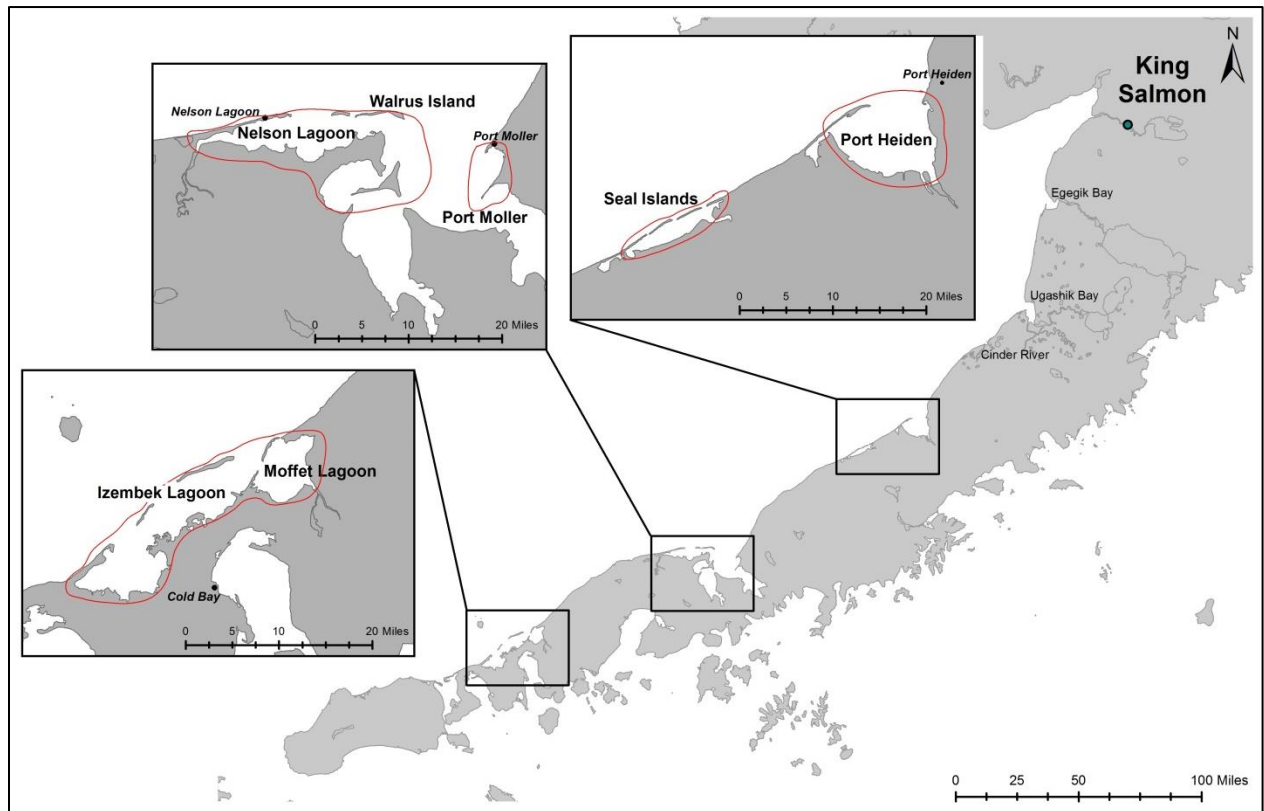


Figure 1. Map of survey area, with inset maps providing detail of primary search zones. Red lines define the boundaries of the areas to be searched annually, as determined by historic distributions of molting eiders. Locations of flocks within these boundaries are typically influenced by tidal stage.

Steller's eiders typically form distinct, dense, single-species flocks, making identification of flocks relatively straightforward. Steller's eiders typically aggregate in deep channels, particularly at low tide, and give a distinctive splash when diving, often en masse. If species identification was in question, we subsequently made a low pass and immediately reviewed low-level photographs to confirm species type. We periodically encountered mixed-species flocks containing Steller's eiders, Pacific common eiders (*S. mollissima* v. *nigrum*), mergansers (*Mergus* spp.), and black scoters (*Melanitta americana*).

Oblique photographs of flocks were taken through open Plexiglas photo ports on the rear passenger window of the pilot side of the aircraft. We used a Canon EOS 5DSR digital camera (50.6 megapixel resolution) with an image-stabilizing lens (70-200mm f4), set to aperture priority mode (with an aperture of f5.6), and set to auto-focus and auto-exposure, with resulting shutter speeds between 1/1000 and 1/3200. The right front seat observer recorded hand-written notes dictated by the photographer. These notes included frame numbers of photos, flock location, flock shape, and any other pertinent information to assist in processing images and counting birds post-survey. Shooting through the open window, the photographer tried to photograph the long linear flocks with a series of overlapping photographs in a single pass. Small, distinct flocks were usually sampled with a single photograph. While in the aircraft, the photographer made an immediate review of the photos to assess quality, recorded frames shot, and dictated to the right front observer any specific notes about photos while flock and photographic details were easy to recall.



Figure 2. Example of image prepared for analysis, and final count of Steller's eiders in the bottom right corner. The red line and "X" delineate the portion of the photo that overlapped with the next photo, and had already been counted.

Post survey, we used Adobe Photoshop CS-6 Extended to prepare photos for flock counting. Notes and image frame numbers taken during the survey were entered into a Microsoft Excel file. Sequences with usable photos were examined by bringing up sequential photos in adjacent windows in Windows Photo Viewer. This allowed us to determine which of the overlapping or duplicate photos were of best quality, verify that all images contained Steller's eiders, and determine which images in a sequence captured the larger flocks with sufficient overlap. Adjacent, overlapping images of long linear flocks were opened and viewed simultaneously in adjacent windows with Adobe Photoshop. Using the brush tool, lines were drawn on the images delineating which portions of the flock should be counted within each individual photo, considering adjacent photo overlap and image quality. Portions of the photo to not be counted were designated with an 'x' (Figure 2). Image frame numbers that warranted counting were entered into a Microsoft Excel file, along with counts of Steller's eiders and any notes about how the image should be counted or presence of other species (Figure 3).

	A	B	C	D	E	F
1	STEI Molt Survey 2016 Photo Counts					
2	Date	Location	Rep #	Frame	Count	Notes
72	8/27/2016	Nelson Lagoon	1	6706	445	Some COEI.
73	8/27/2016	Nelson Lagoon	1	6708	147	
74	8/27/2016	Nelson Lagoon	1	6721	1200	Count entire image, mixed flock, few COEI.
75	8/27/2016	Nelson Lagoon	1	6722	104	Count entire image, mixed flock, some COEI.
76	8/27/2016	Nelson Lagoon	1	6725	106	Count entire image, mixed flock, many COEI.
77	8/27/2016	Nelson Lagoon	1	6730	232	
78	8/27/2016	Nelson Lagoon	1	6734	25	
79	8/27/2016	Nelson Lagoon	1	6735	66	Count entire image.
80	8/27/2016	Nelson Lagoon	1	6738	155	
81	8/27/2016	Nelson Lagoon	1	6740	342	STEI still in breeding plumage!
82	8/27/2016	Nelson Lagoon	1	6743	253	Count entire image.

Figure 3. Example of Excel file listing the photos containing birds to be counted, counts of STEI in photos, and any notes about counting birds (e.g., species identification).

We manually counted the eider flocks using the Adobe Photoshop CS-6 Extended Count tool, which leaves a marker and an incremental number over each bird tagged in the flock (See Figure 4). Species other than Steller's eiders were identified based on relative size and plumage, and were not counted (Appendix 3). After counting the photo, we recorded the total on the bottom right hand corner of the photo (Figure 2).

A replicate survey was performed only at Port Heiden in 2016. We derived an abundance index for molting Steller's eiders by summing average estimates from each lagoon in the survey area.

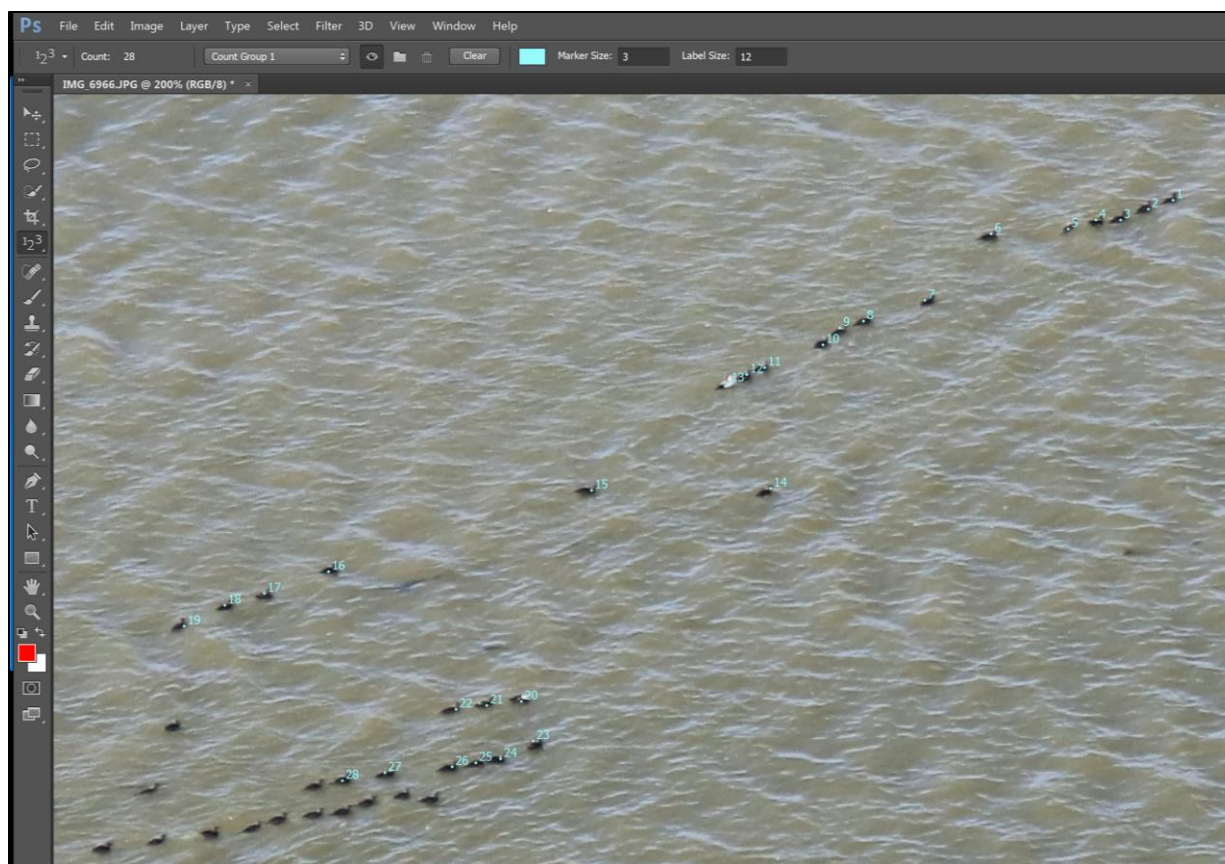


Figure 4. Example of the Adobe Photoshop Count Tool being used to count a flock. With this tool, we positioned the cursor over each bird to be counted and clicked the mouse, leaving a marker and an incremental number over each bird in the flock. (Note bird number 13, a single Steller's eider male still in breeding plumage).

Results and Discussion

Total flight time for the survey was 23.3 hours. Approximately 7.35 hours were needed to search for and photograph flocks. The remaining 15.95 hours were used to shuttle the plane between Anchorage, King Salmon, and Cold Bay. The survey produced 699 original images for analysis. After processing photos to eliminate redundant flocks, 172 unique photos were counted.

We estimated a total of 40,025 Steller's eiders for all surveyed areas. Seal Islands and Nelson and Izembek Lagoons contained 99% of the molting birds we surveyed along the Alaska Peninsula in fall 2016. Proportionally, 61.8% were in the Nelson Lagoon complex, 21.2% were at Seal Islands, and 16.1% were in the Izembek Lagoon system (Table 1). The majority of the birds at Nelson Lagoon were along the lagoon side of Walrus Island, and at Seal Islands they were along the inside of the spit. Most Steller's eiders found in the Izembek Lagoon complex were near Blaine Point and in Norma Bay. The 2016 estimates of molting Steller's eiders were 25% lower than the mean counts from 2012-2015. This difference was particularly notable at Nelson Lagoon.

Table 1. Numbers of molting Steller's eiders at selected locations along the Alaska Peninsula in the fall of 2016, as counted from aerial photographs.

Location	Date(s)	Rep 1	Rep 2	Mean	Proportion of Total
Port Heiden	27, 31-Aug	0	735	368	0.9%
Seal Islands	27-Aug	8,484		8,484	21.2%
Port Moller	27-Aug	0		0	0.0%
Nelson Lagoon	27-Aug	24,716		24,716	61.8%
Izembek Lagoon	1-Sep	6,457		6,457	16.1%
Total				40,025	100%

It should be noted that no flocks were observed during the first replicate survey of Port Heiden on 27 August, but while transiting the aircraft to King Salmon for repairs, two flocks totaling 735 eiders were observed and photographed on 31 August. This apparent change indicates that either Steller's eiders are more transitory than supposed, with birds continuing to move through the survey area in late August, or that detection of flocks by aerial crews is incomplete. Any change in counts, even over a short period of time, indicates the importance of instituting replicate photographic counts for all areas.

Table 2. Estimates of molting Steller's eiders along the Alaska Peninsula from 2012-2016 based on the Steller's eider photographic survey.

Date	Port Heiden	Seal Islands	Port Moller	Nelson Lagoon	Izembek Lagoon	Total
8/27/2012	--	8136	602	35218	5375	
8/28/2012	--	--	--	--	2921	
8/30/2012	341	11392	--	35879	--	
2012 Mean	341	9764	602	35549	4148	50404
8/26/2013	0	6990	--	--	--	
8/27/2013	--	--	--	20832	2585	
2013 Mean	0	6990	--	20832	2585	30407
8/28/2014	--	--	--	47286	--	
8/29/2014	--	17226	--	--	3543	
8/29/2014	--	--	--	--	2967	
9/4/2014	1716	20029	--	--	--	
9/4/2014	2265	--	--	--	--	
9/5/2014	--	--	--	46286	4469	
9/5/2014	--	--	--	--	4448	
9/6/2014	--	15508	99	--	--	
2014 Mean	1991	17588	99	46786	3857	70320
8/30/2015	3387	4369	0	39090	--	
8/31/2015	--	--	--	47016	7155	
9/1/2015	3252	15520	--	--	--	
2015 Mean	3320	9945	0	43053	7155	63473
8/27/2016	0	8484	0	24716	--	
8/31/2016	735	--	--	--	--	
9/1/2016	--	--	--	--	6457	
2016 Mean	368	8484	0	24716	6457	40025

Weather and mechanical issues complicated the 2016 survey and required a longer time period to complete than in previous years. After surveying from King Salmon to Nelson Lagoon on 27 August, inclement weather grounded the survey team in Nelson Lagoon for 3

days. On the next available good weather day, 31 August, the survey crew departed for Cold Bay to survey Izembek Lagoon, but a mechanical issue required a return of the plane to King Salmon for maintenance. Due to personal time constraints, the photographer was required to return to Anchorage, and the note taker assumed the role of photographer for the survey of Izembek Lagoon. An alternate survey aircraft was shuttled from Anchorage to continue the survey while the original aircraft was receiving repairs. Despite these setbacks, we are confident that the single replicate was a thorough survey of the molting population. Owing to the difficulty and length of the survey, replicates were not conducted, with the exception of Port Heiden. We recommend re-instituting replicates for the 2017 survey to measure sampling and temporal variation and to improve accuracy of annual estimates.

Processing and counting photos took approximately 42 hours. We attribute the rapid processing of these photos, relative to past years, to efficient communication between photographer and note taker, excellent crew resource management, improved data management, and increased skill in data collection. A single replicate in 2016 also resulted in fewer photos for analysis than in previous years when replicate surveys were flown.

Flocks are most effectively photographed when they are consolidated and can be photographed in linear, overlapping images. Dispersed flocks, particularly in open water, are difficult to see in the camera viewfinder, and also more difficult to process because the lack of shoreline reference in photographs makes it difficult to determine what sections of photos should be counted. Because only the photographer knows what has been photographed and how, they have the primary responsibility for noting which frames should be counted. It was also important that the right front seat recorder noted exactly what the photographer dictated for each frame set, as subtle differences in wording made reconciliation of photos much easier. We also stress the importance of having the photographer and recorder sort through photos immediately post-flight because it is easier for both to clearly recall photographic details and characteristics of specific flocks, and to interpret associated notes.

Despite the many benefits of a photographic molting survey over the spring migration survey, variation in fall counts may be confounded with variation in production (i.e., more adult females may be present in poor breeding years). Molt migration in sea ducks generally involves early arrival of breeding adult males, non-breeders, and failed breeders (Salomonsen 1968, Hohman et al. 1992) with later arrival of successful breeding females and their broods. Successful breeding females do not depart Arctic breeding grounds until the very end of August or early September (Fredrickson 2001), thus are excluded from the survey. In years when breeding success is low, however, failed breeding females would join males and nonbreeding eiders on molting grounds. Consequently, abundance estimates derived from molt surveys represent a combination of population size and current breeding conditions, and separation of the two can be difficult. While this adds unpredictable variation to annual estimates, we believe that the effect is relatively small due to the predictably low productivity of Steller's eiders, and the consistently low presence of any females within the study area in

early September. For example, during banding drives at Nelson Lagoon in 2006-2008, adult female Steller's eiders accounted for just 10-14% of all molting birds captured during September 6-16 (T. Bowman, USFWS unpubl. data). That proportion would have been even lower earlier during late August molt survey, when the molt survey is flown.

The overall technique for this photographic survey continues to be feasible, and with slight annual modifications, the survey effort has become more efficient and consistent. However, we do not understand the relative contribution of sampling variation (e.g., missed birds, double-counted birds) or variation due to survey timing, versus true population change in the overall variability among annual counts.

Recommendations for Future Surveys

- We suggest boundaries as defined in Figure 1 for a permanent survey area to help standardize coverage among annual surveys and within-year replicates. Boundaries are large enough to include the full extent of previously observed distribution, plus a peripheral buffer area to accommodate potential future distribution shifts. The primary survey areas include Port Heiden, Seal Islands, Port Moller, Nelson Lagoon, and Izembek Lagoon.
- We propose an expanded search of areas outside the core survey area every 5 years to help improve understanding and documentation of the relative distribution of molting Steller's eiders, and possible shifts in distribution among molting areas. The expanded survey should include areas where molting Steller's eiders have been documented in the past (e.g., Kuskokwim Shoals, Lower Cook Inlet).
- Because this survey is funded by the Endangered Species (ES) program, Migratory Bird Management should consult with ES about the objectives and apparent annual variation of the survey, and agree on a long-term plan for the survey.
- We recommend that a minimum of 2 replicate surveys be attempted at each area each year, within one week of each other, to measure sampling errors.
- An aircrew should be scheduled and committed to participate in the entire survey in order to ensure consistency and comparability among replicates.
- A checklist should be developed and utilized to ensure all the batteries are charged, memory cards are cleared and camera settings are appropriate for the specific survey conditions.
- The pilot should be responsible for keeping track of which flock was previously photographed and communicate clearly to the crew if they fly back over an area that was previously photographed.
- The photographer needs to be able to immediately review photos and determine if they are acceptable. If photos are not acceptable, then the area with the flock in question

should be re-flown and re-photographed and unambiguous notes taken to indicate the frames that should be discounted.

- The crew should identify and agree upon clear landmarks as reference points prior to surveying, which will help the crew clearly communicate and document which flocks have or have not been photographed.
- The photographer should have experience with the camera and in taking aerial photos.
- As opportunities arise, the photographer should train the observer in camera operation so there is an alternate experienced photographer if needed. This strategy proved useful in fall 2016, as the primary photographer was unable to complete the survey.
- All photos should be reviewed and documented the day of the survey to ensure adequate photo quality and accurate notes that are easily interpreted for post-survey photo processing.
- Initial processing of photos and delineation of which portions of flocks need to be counted should be done immediately after survey when memory of photos and notes are still fresh.

Acknowledgements

Funding for this project was provided by the U.S. Fish and Wildlife Service (USFWS), Office of Migratory Bird Management (Region 7) and Fisheries and Ecological Services-Endangered Species Program. We thank Michael Swaim (MBM) for assistance in creating Figure 1, and Laura McDuffie (MBM) for assistance processing photographic counts. We also thank the Alaska Peninsula-Becharof and Izembek National Wildlife refuges for providing logistic support in King Salmon and Cold Bay.

The findings and conclusions in this article are those of the authors and do not necessarily represent the views of the U.S. Fish and Wildlife Service.

LITERATURE CITED

- Anderson, A. J., T. D. Bowman, D. K. Marks, and A. R. Williams. 2016. Molting Pacific Steller's eider survey in Southwest Alaska, 2015. Unpublished U.S. Fish and Wildlife Service Report, Migratory Bird Management, Anchorage, Alaska.
- BirdLife International (2012) [WWW document]. URL <http://www.birdlife.org/datazone/species/index.html>.
- Dau, C. P., P. L. Flint, and M. R. Petersen. 2000. Distribution of recoveries of Steller's eiders banded on the lower Alaska Peninsula, Alaska. *Journal of Field Ornithology* 71:541-548.

- Federal Register. 1997. Endangered and threatened wildlife and plants; threatened status for the Alaska breeding population of the Steller's eider. Federal Register 62: 31748–225 31757.
- Flint, P. L., M. R. Petersen, C. P. Dau, J. E. Hines, and J. D. Nichols. 2000. Annual survival and site fidelity of Steller's eiders molting along the Alaska Peninsula. *Journal of Wildlife Management* 64:261-268.
- Hohman, W. L., C. D. Ankney, and D. H. Gordon. 1992. Ecology and management of postbreeding waterfowl. Pp. 128-189, in B. D. J. Batt, A. D. Afton, M. G. Anderson, C. D. Ankney, D. H. Johnson, J. A. Kadlec, and G. L. Krapu, eds. *Ecology and management of breeding waterfowl*. Univ. Minnesota Press, Minneapolis, Minnesota.
- Larned, W. W. 2012. Steller's eider spring migration surveys Southwest Alaska 2012. Unpublished Report. U.S. Fish and Wildlife Service, Migratory Bird Management, Anchorage, Alaska, USA.
- Mallek, E. J., and C. P. Dau. 2012. Aerial survey of emperor geese and other waterbirds in southwestern Alaska, Fall 2011. DRAFT Unpublished Report. U.S. Fish and Wildlife Service, Migratory Bird Management, Fairbanks, Alaska, USA.
- Reed, E.T., J. Bety, J. Mainguy, G. Gauthier, and J.-F. Giroux. 2003. Molt migration in relation to breeding success in greater snow geese. *Arctic* 56:76-81.
- Salomonsen, F. 1968. The molt migration. *Wildfowl* 19:5-24. U.S. Fish and Wildlife Service.
2002. Steller's Eider Recovery Plan. Fairbanks, Alaska.
- Wilson, H. M., T. D. Bowman, W.W. Larned, and J. B. Fischer. 2013. Testing the feasibility and effectiveness of a fall Steller's eider molting survey in southwest Alaska. Unpublished Report. USFWS, Migratory Bird Management, Anchorage Alaska. <http://alaska.fws.gov/mbmp/mbm/waterfowl/surveys/pdf/swsteimolt.pdf>

Appendix 1. Trip itinerary

Pilot: Brad Shults

Photographer: Tim Bowman (8/27-8/31), Alison Williams (9/1)

Recorder: Alison Williams

8/26/2016: Departed Anchorage for King Salmon. Overnighted in King Salmon.

8/27/2016: Surveyed from King Salmon to Port Moller, photographing flocks at Seal Islands.
Re-fueled in Nelson Lagoon. Surveyed and photographed flocks at Nelson Lagoon. Overnighted in Nelson Lagoon.

8/28/2016: Weather day.

8/29/2016: Weather day.

8/30/2016: Weather day.

8/31/2016: Departed Nelson Lagoon to survey Izembek Lagoon. Mechanical issues occurred in flight, returned to King Salmon for repairs. Overnighted in King Salmon.

9/1/2016: Departed King Salmon for Cold Bay. Landed in Cold Bay to unload gear.
Surveyed and photographed flocks at Izembek Lagoon. Overnighted in Cold Bay.

9/2/2016: Departed Cold Bay for King Salmon. Continued to Anchorage.

Appendix 2. Ferry and survey dates, flight hours, and personnel on the molting Pacific Steller's eider survey in Southwest Alaska, 2012-2016.

Year	Date	Hours	Pilot	Photographer	Recorder
2012	8/27-30	16.6	H. Wilson	T. Bowman	W. Larned
2013	8/26-27	15.4	H. Wilson	T. Bowman	W. Larned
2014	8/26-30	19	A. Anderson	T. Bowman	C. Dau
	9/3-6	18.8	H. Wilson	D. Marks	A. Anderson
2015	8/29-9/1	20.8	A. Anderson	T. Bowman	D. Marks
2016	8/26-9/2	23.3	B. Shults	T. Bowman/ A. Williams	A. Williams

Appendix 3. Tips for distinguishing common eiders from Steller's eiders (expanded from appendix in Wilson et al. 2013).

Common eiders:

- Generally larger size
- Obvious white in male plumage
- Orange/lighter bill
- Head and neck more obvious (Steller's eiders appear as one little blob)
- More color contrast between male and female common eiders than with Steller's eiders:
 - Female common eiders generally are lighter brown
 - Males common eiders are dark brown, often w/white patches
 - Steller's eiders are uniform dark brown, regardless of sex

